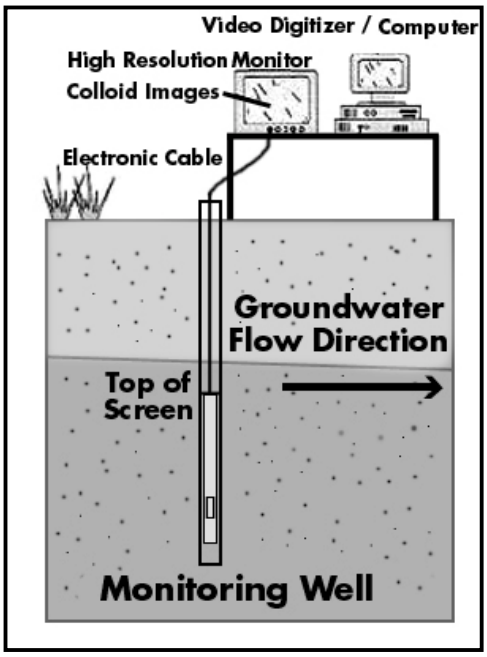
FACT SHEET
Colloidal Borescope Technology

Department of the Navy RAB/TRC Training Workshop

What is a Colloidal Borescope?

A colloidal borescope measures groundwater flow direction and rate in the field in the ground where the contamination is located. It is a new technology developed by the Oak Ridge National Laboratory Environmental Technology Section (ORNL/ETS), a partner in developing and demonstrating innovative environmental cleanup technology with the Navy.



How does a Colloidal Borescope work?

The colloidal borescope consists of two video cameras, a ball compass, an optical magnification lens, an light source, and stainless steel housing. The borescope is inserted into a monitoring well and fixed at the surface with a clamp. Once inserted into a well, the device transmits video still shots (frames) of natural particles in the well. Integrated software is used to compare the video frames and record the average particle size, the number of particles, and the groundwater speed and flow direction. The use of a compatible computer allows for groundwater flow measurements to be analyzed every four seconds. After only a few minutes of observations, a large database is created, and groundwater flow and direction can be determined.

The instrument can be used in a well as small as 5 cm in diameter. The stainless steel construction allows for easy decontamination and little maintenance is required. The integrity of waterproof seals is checked periodically.

Why use the Colloidal Borescope?

There are many benefits to using the colloidal borescope. They are as follows:

- Existing monitoring wells are used for assessment, thus avoiding the cost of additional well installation.
- More data may be collected in a shorter period of time.
- Groundwater modeling can be validated by conducting several measurements at the site.

Where has the Navy implemented the Colloidal Borescope?

Because the colloidal borescope is so new, its use has been limited to a few sites at the Navy's Naval Air Station North Island and, more recently, a couple of Department of Energy and Environmental Protection Agency sites. The pilot project at North Island was important in assisting ORNL/ETS with the improvement of the borescope.

References

- Navy Environmental Leadership Program, NAS North Island – Navy Region Southwest, Colloidal Borescope for Groundwater Flow Characterization.
- Navy Environmental Leadership Program Bulletin, December 1998.
- Department of the Navy, Environmental Restoration For Future Generations, Report for Fiscal Years 2000-2004, February 2000.

For further information visit:

http://www.wpi.org/initiatives/init/summer00/
http://nelp.navy.mil/nelp_guide_4/cleanup/borescope.htm
http://www.mayportnelp.com/pdf/contractor/bulletin2.pdf